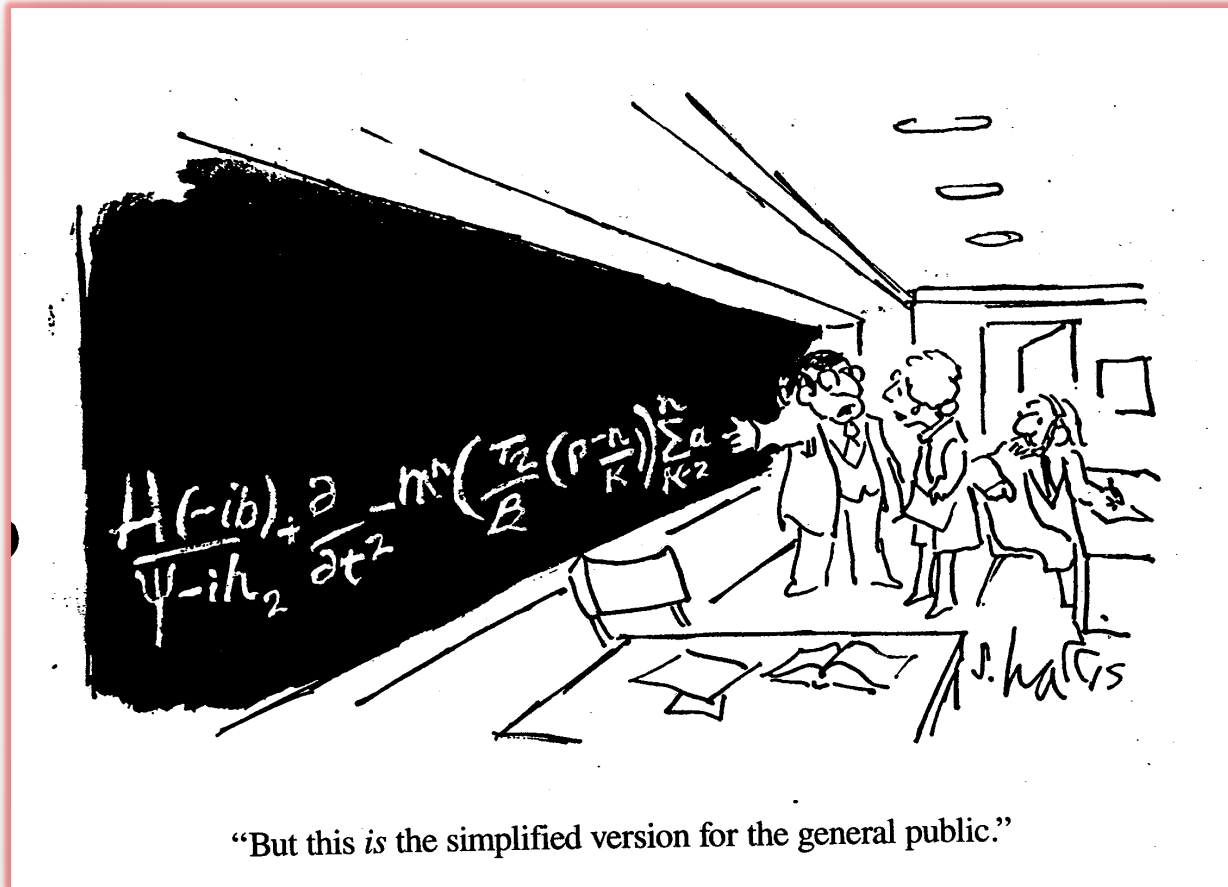


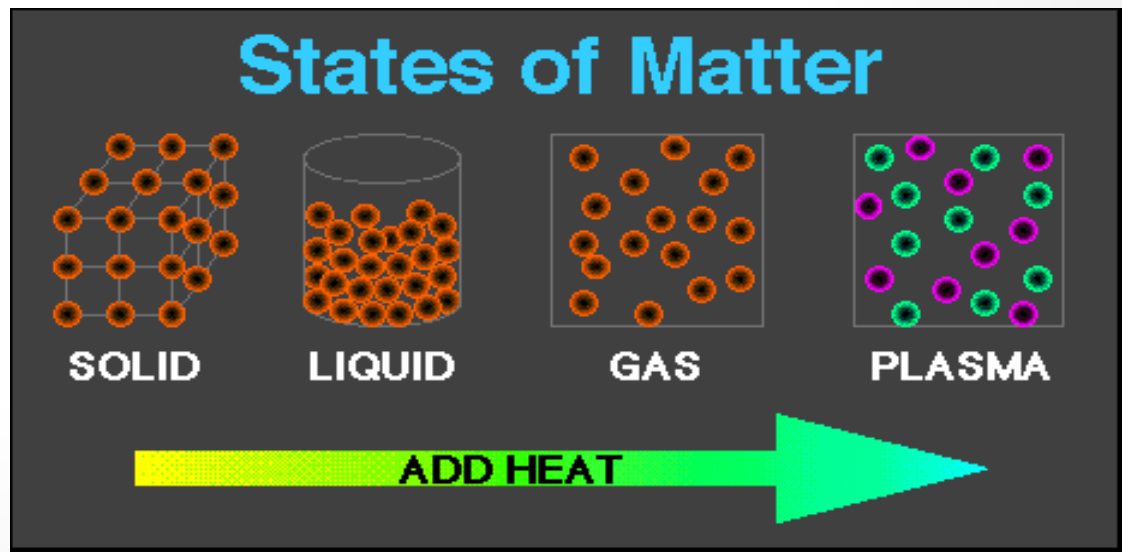
T01D02 – SL/HL Chem 1

Today we go back ☺



Classification of Matter

- Matter – anything that has mass and takes up space. Anything!
- Chemistry – the study of matter and the changes it undergoes.
- All matter can exist in three (3) states:
 - Solid
 - Liquid
 - Gas
 - Plasma



Forces and Phases

- Substances with very little intermolecular attraction exist as gases
- Substances with strong intermolecular attraction exist as liquids
- Substances with very strong intermolecular (or ionic) attraction exist as solids



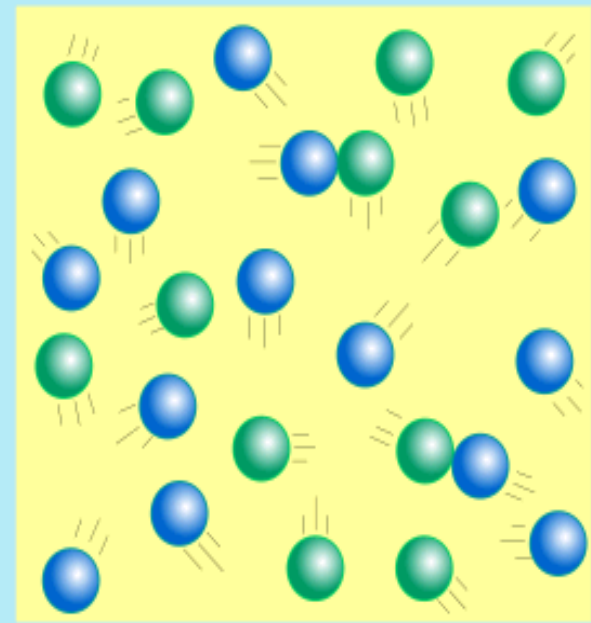
Gas – neither definite volume nor definite shape; particles are at great distances from one another; particles are free to move

Liquid – definite volume but indefinite shape; particles close together but not in fixed positions; particles are free to move

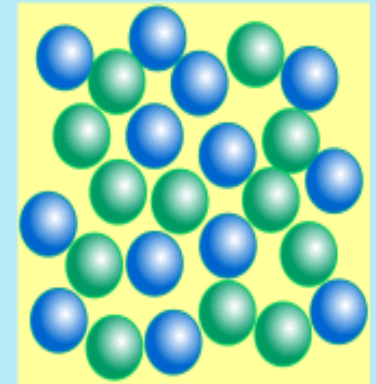
Solid – definite volume and shape; particles packed in fixed positions; particles are not free to move



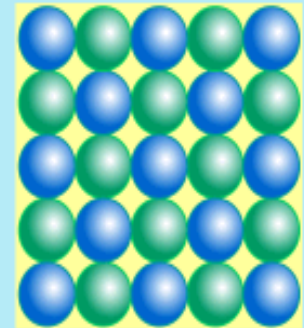
Gas



Liquid



Solid



Physical Properties of Gases

1. Highly compressible
2. Low density
3. Fill container completely
4. Assume shape of container
5. Rapid diffusion
6. High expansion on heating



Physical Properties of Liquids

1. Slightly compressible
2. High density
3. Definite volume, does not expand to fill container
4. Assumes shape of container
5. Slow diffusion
6. Low expansion on heating

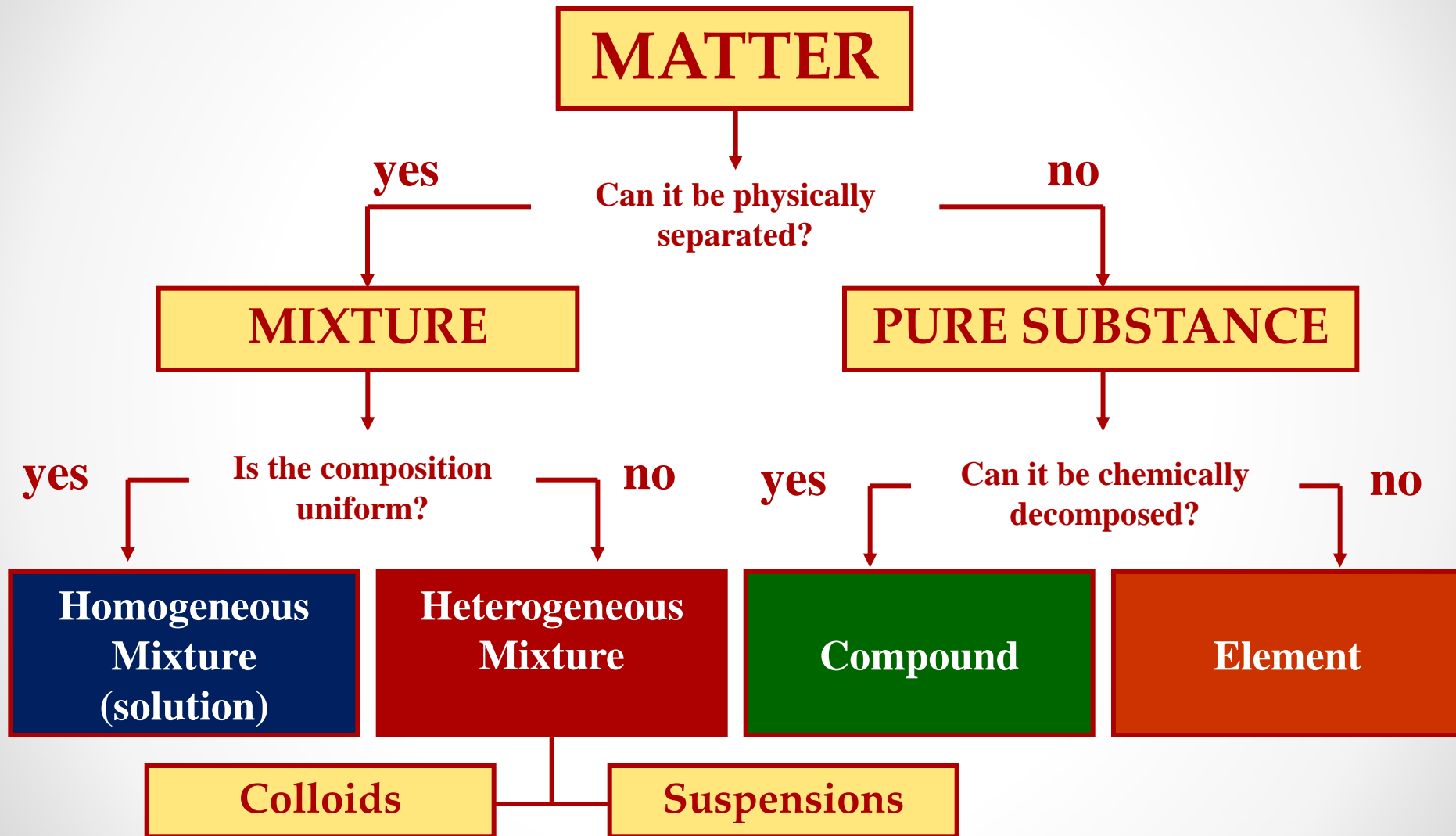


Physical Properties of Solids

1. Slightly compressible
2. High density
3. Rigidly retains its volume
4. Retains its own shape
5. Extremely slow diffusion; occur surfaces
6. Low expansion on heating



Matter Flow Chart



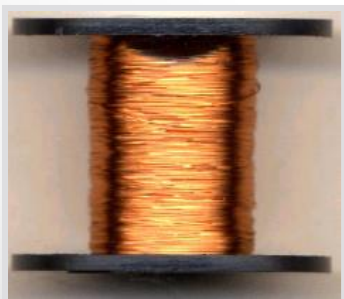
Divisions of Matter

- Substance: definite or constant composition and distinct properties
 - Compounds or Elements
 - Water, silver, ethanol, salt, carbon dioxide, Neon
- Mixture: Combination of 2 or more substances in that retain their distinct identities.
 - Homogeneous or Heterogeneous
 - Air, soft drinks, milk, cement



Elements vs. Compounds

- Element: substance that *cannot* be separated into simpler substances by *chemical* means.
 - First letter is always capitalized, second is lower case. (ie, Cobalt, Co)
 - Most elements named using English:
 - C (Carbon), Br (Bromine), Ne (Neon)
 - Some named after Latin routes:
 - Au (Aurum – Gold), Fe (Ferrum – Iron), Na (Natrium – Sodium)



Elements vs. Compounds

- Compound: a substance composed of two or more elements chemically united in fixed proportions.
 - H_2O – water
 - NaCl – table salt
 - Unlike mixtures, compounds can be separated only by chemical means into their pure substances.



Homogeneous vs. Heterogeneous

- The composition of the mixture is the same throughout the mixture
 - Collect any two parts and they will have the same composition.
 - Salt water
 - Air
 - Apple Juice

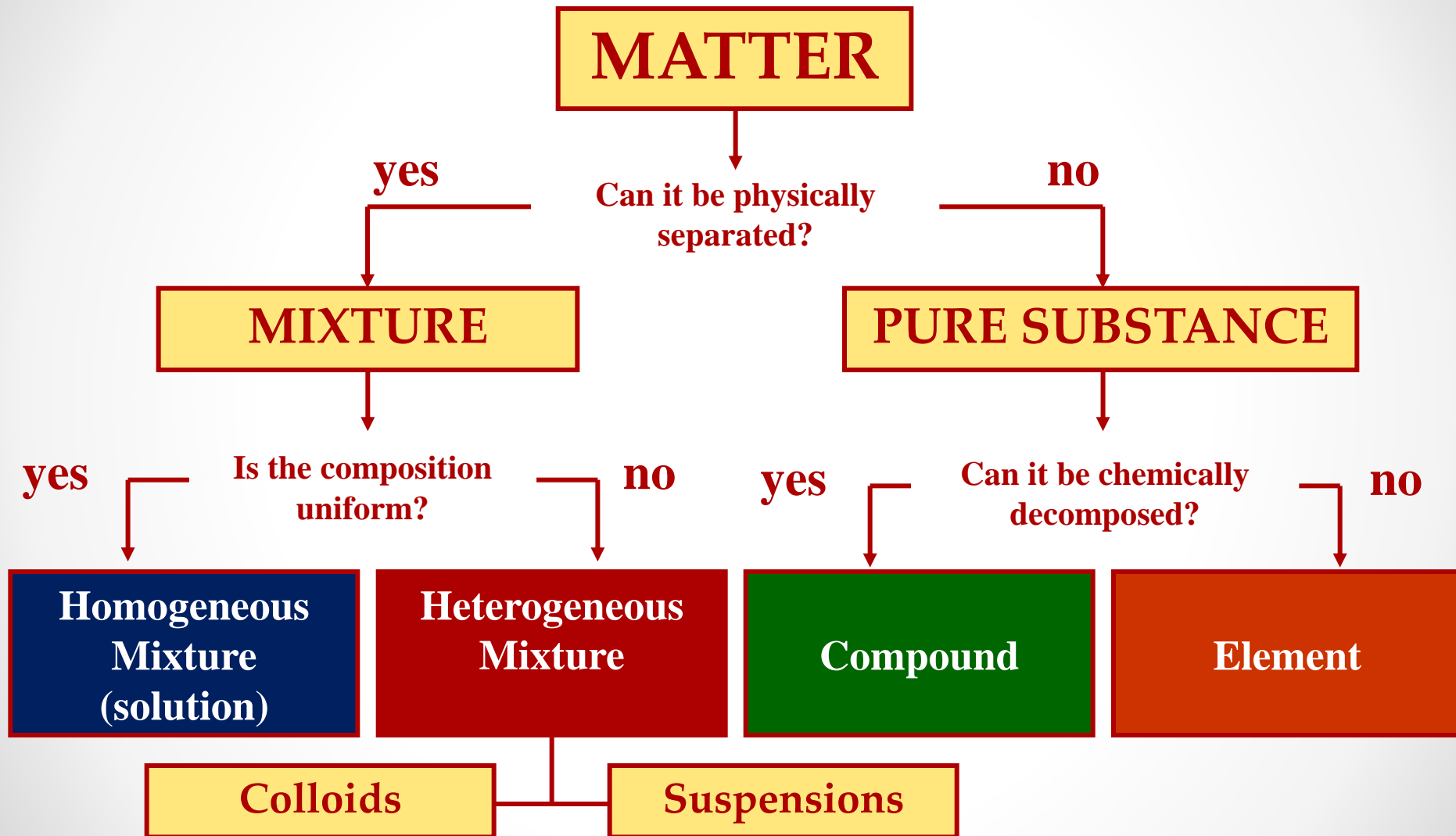


Homogeneous vs. Heterogeneous

- The composition of the mixture is NOT uniform.
 - Parts may be dissimilar, often visually
 - Sand and iron filings
 - Oil and water
 - Spaghetti Sauce
 - Orange Juice w/ Pulp



Matter Flow Chart



Physical vs. Chemical

Properties

- Substances are identified by their properties as well as by their composition.
- *Physical Property*
 - can be observed without changing the identity of the substance
- Chemical Property
 - describes the ability of a substance to undergo changes in identity



Physical vs. Chemical Changes

- *Physical Change*

- changes the form of a substance without changing its identity
- properties remain the same

- Chemical Change

- changes the identity of a substance
- products have different properties



Chemical Changes

- Signs of a Chemical Change
 - change in color or odor
 - formation of a gas
 - formation of a precipitate (solid)
 - change in light or heat



Extensive vs. Intensive

- *Extensive Property*

- depends on the amount of matter present

- Intensive Property

- depends on the identity of substance, not the amount



Physical and Chemical Changes Lab

- Each person works alone
- You may discuss together
- You will each get a different “practice write up assignment”
- The focus is format, not results

